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EXAMINER

DUONG, THOMAS

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/822,431	Applicant(s) ROA, GUILLERMO	
	Examiner Thomas Duong	Art Unit 2454	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 16 February 2011.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 3-13, 15, 17-19 and 27-29 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 3-13, 15, 17-19 and 27-29 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 12 April 2009 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Amendment

1. This office action is in response to the Applicants' Amendment After Non-Final Amendment filed on February 16, 2011. *Claims 3-13, 15, 17-19 and 27-29* are presented for further consideration and examination.
2. Applicants' request for reconsideration of the Non-Final Rejection dated August 16, 2010 is persuasive and, therefore, the Office Action dated August 16, 2010 is withdrawn and is now replaced with this current Office Action.

Response to Argument

3. Applicants' arguments, see pg.7-14, filed February 16, 2011, have been fully considered and are persuasive. Therefore, the Office Action dated August 16, 2010 is withdrawn and is now replaced with this current Office Action.

Claim Rejections - 35 USC § 101

4. 35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.
5. Claim 29 is rejected under *35 USC § 101* because the claims are not limited to tangible embodiments since they do not claim physical articles or objects as part of the claims to establish a statutory category as a machine or manufacture, and they are clearly not to a

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process or composition of matter. As claimed, “*A computer readable medium containing executable program instructions...*” fails to fall within a statutory category of invention; because it is well known that computer readable medium includes both transitory and non-transitory types of media, with the former being non-statutory. As such, the above claims are not limited to statutory subject matter and are, therefore, non-statutory. Hence, in order to overcome this *35 USC § 101* rejection, the above claims need to be amended to include only the physical computer media and not a transmission media or other intangible or non-functional media. The Examiner suggests a possible amendment to be “*A non-transitory computer readable medium containing executable program instructions...*”

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 3, 6, 12-13, 15, 17 and 27-29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hoese et al. (US6789152B2) and in view of Shu et al. (US7555772B2).

8. With regard to claims 27-29, Hoese discloses a system comprising:

- *a processor; a memory coupled to the processor;* (Hoese, col.6, lines 3-18)

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Hoesse discloses, *"To accomplish its functionality, one implementation of the storage router uses: ... an Intel 80960RP processor, incorporating independent data and program memory spaces..."* Hence, Hoesse teaches of the storage router (i.e., Applicants' system) including an Intel processor (i.e., Applicants' processor) and memory spaces (i.e., Applicants' memory).

- *a storage operating system resident in the memory and executed by the processor, the storage operating system implementing a file system configured to provide storage service of information stored on the system; (Hoesse, col.6, lines 3-18)*

Hoesse discloses, *"To accomplish its functionality, one implementation of the storage router uses: ... and an operating system based upon the WIND RIVERS SYSTEMS VXWORKS or IXWORKS kernel, as determined by design. In addition, the storage router includes software as required to control basic functions of the various elements, and to provide appropriate translations between the FC and SCSI protocols"*. Hence, Hoesse teaches of the storage router (i.e., Applicants' system) including an operating system (i.e., Applicants' storage operating system) and would be inherent to include a file system (i.e., Applicants' file system) in order to control basic functions and to provide translations among protocols (i.e., Applicants' provide storage information).

- *a plurality of network interfaces configured to process received block-based protocol data access requests, each network interface assigned to one or more network addresses, each network interface further assigned an identifier that binds the network interface to an address space that includes the one or more*

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network addresses; and (Hoese, col.3, lines 41-43; col.2, lines 12-15; col.7, lines 34-38; figure 2)

Hoese discloses, *"Storage router 44 routes requests from initiator devices on one medium to target devices on the other medium and routes data between the target and the initiator"*. Hoese discloses, *"The storage router then allows access from the workstations to the SCSI storage devices using native low level, block protocol in accordance with the mapping and the access controls"*. Hence, Hoese teaches of the storage router (i.e., Applicants' system) allowing access (i.e., Applicants' configured to process) to the workstations' requests (implied) using native level, block protocol and routing them (i.e., Applicants' block-based protocol data access request) from initiator device (e.g., workstation) implying that the storage router must have received the request via network interface (implied) (i.e., Applicants' network interface). Hoese discloses, *"A primary method of addressing management commands though the FCP and SCSI interfaces can be through peripheral device type addressing. For example, the storage router can respond to all operations addressed to logical unit (LUN) zero as a controller device"*. Hence, Hoese teaches of the interfaces addressed to logical unit (LUN) zero (i.e., Applicants' identifier that binds the network interface to an address space including one or more network addresses) and it is well known in the art that network interfaces include 'hard-coded' (e.g., MAC) address (i.e., Applicants' network interface assigned to one or more network addresses).

- *a plurality of context data structures stored in the memory and containing configuration information to establish a plurality of instances of virtual servers executed by the processor, ... each virtual server further configured to share*

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access to the file system to service the block-based protocol data access requests by converting the block-based protocol data access requests to appropriate file system data requests when providing the storage service of the information stored on the system. (Hoese, col.4, lines 17-22; col.2, lines 1-4; col.2, lines 12-15; col.6, lines 15-18; figure 3)

Hoese discloses, “As shown in FIG. 3, for example, storage device 60 can be configured to provide global data 65 which can be accessed by all workstations 58. Storage device 62 can be configured to provide partitioned subsets 66, 68, 70 and 72, where each partition is allocated to one of the workstations 58

(workstations A, B, C and D)”. Hence, Hoese teaches of storage device 62 configured with configurations (implied) (i.e., Applicants’ context data structures) to provide partitioned subsets 66, 68, 70 and 72 (i.e., Applicants’ instances of virtual servers). Hoese discloses, “According to one aspect of the present invention, a storage router and storage network provide virtual local storage on remote SCSI storage devices to Fibre Channel devices”. Hoese discloses, “The storage router then allows access from the workstations to the SCSI storage devices using native low level, block protocol in accordance with the mapping and the access controls”. Hoese discloses, “In addition, the storage router includes software as required to control basic functions of the various elements, and to provide appropriate translations between the FC and SCSI protocols”.

Hence, Hoese teaches of the storage router (i.e., Applicants’ system) and the storage network providing virtual local storage (i.e., Applicants’ virtual server) that is capable of allowing access (i.e., Applicants’ to service) to the workstations’ requests (implied) using native level, block protocol and routing them (i.e.,

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Applicants' block-based protocol data access request) from initiator device (e.g., workstation) by providing appropriate translations (i.e., Applicants' converting) between the FC and SCSI protocols.

However, Hoese does not explicitly disclose,

- *... each virtual server allocated resources that include a partitioning of the network interfaces and assigned network addresses to establish a distinct security domain for that virtual server that enables controlled access to the allocated network interfaces and assigned network addresses,...*

Shu teaches,

- *... each virtual server allocated resources that include a partitioning of the network interfaces and assigned network addresses to establish a distinct security domain for that virtual server that enables controlled access to the allocated network interfaces and assigned network addresses,...* (Shu, col.8, lines 55-62)

Shu discloses, "A firewall can be partitioned into multiple virtual systems. Either or both of the Gi Firewall 163 or GTP Firewalls 143 can be within a virtual system. Each virtual system is a unique security domain and can be managed by administrators who can individualize (e.g., including setting up address books and policies) the security protections for the given domain. The Gi Firewall 163 and GTP Firewall 143 can be either in the same virtual system or in different virtual systems" (Shu, col.8, lines 55-62). Hence, Shu teaches of different virtual systems 143 and 163 (i.e., Applicants' each virtual server) with their own communication modules 147 and 167 (e.g., communication interfaces) (i.e., Applicants' allocated resources that include partitioning of network interfaces and

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addresses) to provide a unique security domain (i.e., Applicants' to establish a distinct security domain).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention was made to combine the teachings of Shu with the teachings of Hoese to improve Hoese's teachings of partitioned subsets of virtual servers by implementing Shu's teachings to utilize firewalls to set up distinct security domains in order to provide sufficient security check among members accessing their appropriate data stores.

9. With regard to claims 3 and 17, Hoese and Shu disclose a system,

- *further comprising storage media configured to store information as units of storage resources, the units of storage resources allocated among each of the virtual servers.* (Hoese, col.4, lines 17-22; figure 3)

Hoese discloses, "As shown in FIG. 3, for example, storage device 60 can be configured to provide global data 65 which can be accessed by all workstations 58. Storage device 62 can be configured to provide partitioned subsets 66, 68, 70 and 72, where each partition is allocated to one of the workstations 58 (workstations A, B, C and D)". Hence, Hoese teaches of storage device 62 (i.e., Applicants' storage media) configured with configurations (implied) (i.e., Applicants' context data structures) to provide partitioned subsets 66, 68, 70 and 72 (i.e., Applicants' units of storage resources among instances of virtual servers).

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10. With regard to claim 6, Hoese and Shu disclose a system,

- *wherein the file system is configured to perform a boundary check to verify that a request is allowed to access certain units of the storage resources on the storage media, each virtual server further configured to create virtual disks within the units of storage resources and wherein each of the virtual disks is associated with one or more of the virtual servers.* (Hoese, col.2, lines 12-15; figure 3)

Hoese discloses, “The storage router then allows access from the workstations to the SCSI storage devices using native low level, block protocol in accordance with the mapping and the access controls”. Hoese discloses, “These subsets 66, 68, 70 and 72 can only be accessed by the associated workstation 58 and appear to the associated workstation 58 as local storage accessed using native low level, block protocols”. Hence, Hoese teaches of the partitioned subsets can only be accessed by the associated workstations implying that there is an access check (i.e., Applicant's access check) based on the particular container (i.e., Applicant's boundary).

11. With regard to claims 12-13, Hoese and Shu disclose a system,

- *wherein the block-based protocol comprises iSCSI.* (Hoese, col.2, lines 1-9)

Hoese discloses, “According to one aspect of the present invention, a storage router and storage network provide virtual local storage on remote SCSI storage devices to Fibre Channel devices. A plurality of Fibre Channel devices, such as workstations, are connected to a Fibre Channel transport medium, and a plurality of SCSI storage devices are connected to a SCSI bus transport medium. The storage router interfaces between the Fibre Channel transport medium and the

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SCSI bus transport medium". Hence, Hoese teaches of block based protocols

SCSI (i.e., Applicants' iSCSI) and Fibre Channel (i.e., Applicants' FCP).

- *wherein the block-based protocol comprises FCP.* (Hoese, col.2, lines 1-9)

12. With regard to claim 15, Hoese and Shu disclose a system,

- *wherein the system is further configured to process data access requests in response to one or more file-level protocols.* (Hoese, col.2, lines 1-9)

Hoese discloses, "According to one aspect of the present invention, a storage router and storage network provide virtual local storage on remote SCSI storage devices to Fibre Channel devices. A plurality of Fibre Channel devices, such as workstations, are connected to a Fibre Channel transport medium, and a plurality of SCSI storage devices are connected to a SCSI bus transport medium. The storage router interfaces between the Fibre Channel transport medium and the SCSI bus transport medium". Hence, Hoese teaches of file-level block based protocols SCSI and Fibre Channel (i.e., Applicants' one or more file-level protocols).

13. Claims 4-5 and 18-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hoese et al. (US6789152B2), in view of Shu et al. (US7555772B2) and further in view of Mane et al. (US20050050107A1).

14. With regard to claims 4-5 and 18-19, Hoese and Shu disclose a system,

See *claims 3 and 17* rejection as detailed above.

However, Hoese and Shu do not explicitly disclose,

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- *wherein the units of storage resources comprise volumes.*
- *wherein the units of storage resources comprise qtrees.*

Mane teaches,

- *wherein the units of storage resources comprise volumes. (Mane, para.25)*

Mane discloses, *"The processor 25 includes a number of program layers, including a network interface 26 for coupling to the data network, a file system layer 27 for organizing data into a hierarchical file system of files and directories, a volume layer 28 for organizing the data into logical volumes of data blocks, and a Small Computer System Interface (SCSI) driver 29 for linking the volume layer 28 to the disk storage 24"*. Hence, Mane teaches of logical volumes of data blocks (i.e., Applicant's volumes) as units of storage resources.

- *wherein the units of storage resources comprise qtrees (Mane, para.6)*

Mane discloses, *"In accordance with another aspect, the invention provides a method of maintaining quotas for storage resources used by a file server for storing files in selected directory trees of a file system. The file server has a tree quota database of usage values of the storage resources and limit values for the storage resources for the selected directory trees of the file system"*. Hence, Mane teaches of a tree quota database (i.e., Applicant's qtree) as a unit of storage resources.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention was made to combine the teachings of Mane with the teachings of Hoese and Shu to improve Hoese and Shu's teachings of partitioned subsets of virtual servers utilizing firewalls to set up distinct security domains by implementing

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Mane's teachings of utilizing qtree in order maintaining quotas for storage resources used by a file server.

15. Claims 7-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hoeser et al. (US6789152B2), in view of Shu et al. (US7555772B2) and further in view of George et al. (US7010663B2).

16. With regard to claim 7, Hoeser and Shu disclose a system,

See *claim 6* rejection as detailed above.

However, Hoeser and Shu do not explicitly disclose,

- *wherein the storage operating system further comprises a user interface having a command set configured to operate on virtual disks, and wherein the command set executes within a context of a virtual server.*

George teaches,

- *wherein the storage operating system further comprises a user interface having a command set configured to operate on virtual disks, and wherein the command set executes within a context of a virtual server. (George, col.5, lines 33-41)*

George discloses, "Referring now to FIG. 2, the data storage device 120 of FIG. 1 is shown that provides for managing a plurality of virtual LUNs over one or more existing volumes of storage within the storage device 120, in accordance with one embodiment of the present invention. The data storage device 120 comprises two interfaces for receiving and sending command line interface (CLI) instructions and Input/Output (I/O) data. The interfaces include a CLI interface and a hypertext transfer protocol (HTTP) interface". Hence, George teaches of

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two interfaces (i.e., Applicant's user interface) for receiving and sending instructions (i.e., Applicant's having a command set) for managing (i.e., Applicant's configured to operate on) a plurality of virtual LUNs (i.e., Applicant's virtual disks) over one or more existing volumes of storage via the virtualization layer (i.e., Applicant's within a context of a virtual server).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention was made to combine the teachings of George with the teachings of Hoese and Shu to improve Hoese and Shu's teachings of partitioned subsets of virtual servers utilizing firewalls to set up distinct security domains by providing the expansion of an existing data storage system into a plurality of virtual data storage systems.

17. With regard to claims 8-9, Hoese, Shu and George disclose a system,

- *wherein the user interfaces comprises a command line interface (CLI) configured to support the command set. (George, col.5, lines 33-41)*

George discloses, "The data storage device 120 comprises two interfaces for receiving and sending command line interface (CLI) instructions and Input/Output (I/O) data. The interfaces include a CLI interface and a hypertext transfer protocol (HTTP) interface".

- *wherein the CLI comprises a lun command configured to perform operations to a virtual disk associated with the context of the virtual server. (George, col.5, lines 42-54)*

George discloses, "Typically, the CLI interface provides access by a user (e.g., system administrator) to configure, update, and/or modify the data storage device

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120, such as, creating or removing virtual LUNs, and expanding or reducing the size of virtual LUNs, etc”.

18. With regard to claims 10-11, Hoese, Shu and George disclose a system,

- *wherein the lun command creates a logical unit number on the file system, the logical unit number being associated with the context of the virtual server.*

(George, col.5, lines 42-54)

George discloses, “Typically, the CLI interface provides access by a user (e.g., system administrator) to configure, update, and/or modify the data storage device 120, such as, creating or removing virtual LUNs, and expanding or reducing the size of virtual LUNs, etc”.

- *wherein the CLI comprises an igroup command that generates a set of file system primitive for binding an initiator group to one or more initiator addresses and wherein the initiator group is associated with the context of the virtual server.*

(George, col.5, lines 42-54)

Conclusion

19. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thomas Duong whose telephone number is 571/272-3911. The examiner can normally be reached on M-F 7:30AM - 4:00PM. If attempts to reach the examiner by telephone are unsuccessful, the examiner’s supervisor, Joseph Avellino can be reached on 571/272-3905. The fax phone numbers for the organization where this application or proceeding is assigned are 571/273-8300 for regular communications and 571/273-8300 for After Final communications.

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/Thomas Duong/

Patent Examiner, Art Unit 2454

February 22, 2011

/Joseph E. Avellino/

Supervisory Patent Examiner, Art Unit 2454